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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • AUGUST 8, 1942

Quinine Trail

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A SCIENCE SERVICE PUBLICATION

PHARMACY

Medicine from Fagara Coco

Tree in Argentina yields drug that may be an effective substitute for quinidine in treating diseases of the heart rhythm.

➤ DISCOVERY of a possible substitute for a heart disease medicine now very scarce because of the war is announced by five Argentine scientists (*Science*, July 20). The scientists are Dr. Venancio Deulofeu, Dr. Rafael Labriola, Dr. Alberto Taquini, all of the University of Buenos Aires, and Dr. Oscar Orias and Dr. E. Moisset de Espanes of the University of Cordoba.

Fagarine is the name of the new drug, which from tests on animals and human patients seems likely to prove effective in heart disease characterized by auricular flutter and auricular fibrillation or other disturbances of the heart rhythm.

Quinidine has previously been used in such forms of heart disease. As its name suggests, quinidine is related to quinine and like quinine is obtained from the bark of the cinchona tree. Since the Jap invasion of Java, previously the source of most of the world's supply of quinine, quinidine has also been very scarce.

Fagarine comes from the leaves and young twigs of *Fagara coco*, a tree growing in central and northern Argentina. It was first isolated by another scientist, G. Stuckert. Chemical studies by Drs. Deulofeu, Labriola and associates indicate that it is composed of 19 carbon, 23 hydrogen, one nitrogen and four oxygen atoms. A probable structural formula for their arrangement in the fagarine molecule has been worked out.

Fagarine is more active in its effect on the heart than quinidine when given in the same doses, animal studies showed.

Six patients, two with auricular flutter and four with rheumatic heart disease and auricular fibrillation, have been given fagarine by Dr. Taquini, the heart specialist of the five-man research team. In all but one of these patients quinidine in the usual dose had failed.

Within 30 minutes after a single dose of fagarine, injected into the muscles, normal heart rhythm was restored in all six patients. In one patient the flutter started up again 28 days later as a result of an unusual effort made by the patient. Another dose of fagarine was again enough to restore the normal rhythm.

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PHYSIOLOGY

Test Before Transfusion

No girl should be given blood without Rh test, physicians are warned. Less than one cubic centimeter of Rh positive blood may be fatal to baby years later.

➤ NO BLOOD transfusion should be given to a young woman, a girl, or even a newborn girl baby unless tests for the Rh blood group are made first. This warning is given physicians in the *Journal of the American Medical Association* (July 28) by Dr. Philip Levine, of the Ortho Research Foundation, pioneer in Rh research.

In case the girl happens to have Rh negative blood, a transfusion of Rh positive blood may cause the death years later of her first-born baby, Dr. Levine has found.

What happens in case of the mingling of Rh positive blood with the incompatible Rh negative blood is a process like immunization against disease. A reaction is set up which serves to destroy the Rh positive blood just as the blood of an immunized person checks the invading germs of a disease.

The evidence is that unbelievably small amounts of blood will set up this immunization, Dr. Levine points out. The passage of much less than one cubic centimeter of Rh positive blood from the unborn baby to the Rh negative mother's bloodstream is enough to set up this immunization. If, after that, the woman should have an Rh positive baby, the baby would be killed or made very ill by its own mother's blood.

And the indications are that once a person is immunized, that person will remain immunized for the rest of his or her life. Although the Rh positive-killing antibodies in the blood may disappear in a relatively short time, the tissues responsible for the production of these antibodies remain capable of responding far more rapidly to any invasion of Rh positive blood. So that even though, after a time, blood tests may not show the presence of any immune antibodies in the blood, the immunization must be considered permanent.

Dr. Levine reported the case of a young woman, 20 years old, whose first baby was born with the most severe form of erythroblastosis fetalis, the disease caused by Rh incompatibility. This happened because she received seven transfusions of her father's blood when she was only six years old.

Before the fairly recent use of vitamin K as an anti-bleeding agent, it was a common practice to give newborn babies an injection of blood into their muscles, since it is rather difficult to transfuse blood into the small veins of infants. This process, like pregnancy, is particularly likely to immunize, because it feeds minute quantities of blood into the bloodstream over a long period of time. But any blood transfusion of incompatible blood is likely to cause immunization, Dr. Levine emphasized.

Dr. Levine hopes that application of his recommendation that no girl baby or young girl should ever be given blood in any way until she is tested for Rh, will save the lives of many babies in the future.

Even a recently recommended biologic test to detect Rh incompatibility can itself serve to immunize, Dr. Levine reported.

Discovery that the incompatible blood of the mother could cause the death of her own baby was not made until eight years ago when Dr. Levine studied the case of a young woman whose second baby was born dead. He found that the mother's blood would not mix with that of the father although both had group O blood. That was the first clue to the medical puzzle of why many families had been able to have one child and never any more that would live until birth or beyond the first few days of life.

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Indium, a minor metal, is proving useful in bearings; when plated on the face of the bearing and heated, it diffuses into the surface and retards wearing thus prolonging the life of the bearing.

ENGINEERING-PHARMACY

Quinine from Green Bark

New portable extraction plant can take malaria-fighting drug and other important chemicals from cinchona trees where they grow in inaccessible forests.

See **Front Cover**

➤ A NEW weapon against malaria, promising better health to millions of civilians in the Americas, has been developed by the Cinchona Research Unit of the Engineer Board, U. S. Army. Major Robert Lee Kaye is commanding officer of the Unit and Lt. Silvio E. Ronzone is executive officer.

The weapon consists of a portable plant for extracting quinine and other anti-malaria drugs from the bark of the cinchona trees on the spot where they grow in almost impenetrable forests of Latin America.

If the portable extraction plants had been available before Pearl Harbor, they might have been used to produce, from cinchona trees growing in the Philippines, medicine for the malaria victims among the defenders of Bataan.

The medicine these portable plants extract is totaquina. Totaquina contains quinine and other related chemicals, called alkaloids, found in cinchona bark. It is considered a satisfactory remedy for malaria, though opinions may differ on its value compared to quinine and atabrine, the synthetic chemical now chiefly used for treating malaria.

A specific remedy for one form of heart disease is among the alkaloids of the cinchona bark. This drug, quinidine, has been very scarce since the Dutch cinchona plantations on Java were lost to the Japs. More quinidine for heart disease patients seems on the way, through the Engineer Board's cinchona extraction plants.

One of these cinchona extraction plants was recently exhibited in one of the Engineer Board's laboratories. Four of them will shortly be shipped to Latin American countries. One is destined for permanent location in Costa Rica, where the War Department and the Foreign Economic Administration have developed a cinchona plantation from seeds developed in the Philippines by Col. Arthur E. Fischer and flown out by him just prior to the Japanese occupation.

The plant consists of three fabric bags, shoulder-high and about as wide, jungle-green in color, watertight and resistant to acid and alkali. With these are three tall metal cylinders, three smaller fabric bags suspended from an overhead wooden rack, a small gasoline motor pump and a set of fabric drying trays, racked one above another with space between to reach about shoulder height.

The whole thing weighs 1,500 pounds and the necessary chemicals for one month's operation weigh another 1,000 pounds. The plant breaks down into units small enough for mules or men to carry over the mountain trails through the Andean rain forests. It can be operated by one intelligent man with the assistance of native laborers. Names of different parts of the equipment are painted on in Spanish, and some parts are painted in different colors for ease in directing operations by those who cannot read.

The principle of operation, and the key to the success of the plant, is contained in the tall metal cylinders known as ion exchangers. In these are fine particles of material which looks like charcoal but is not. The name of the material is a military secret, because the Army also uses it for many other purposes. It is no secret that this and similar materials from coal or resins can adsorb either negatively or positively charged ions, according to the electric charges they carry. Charcoal can be made to do this, too.

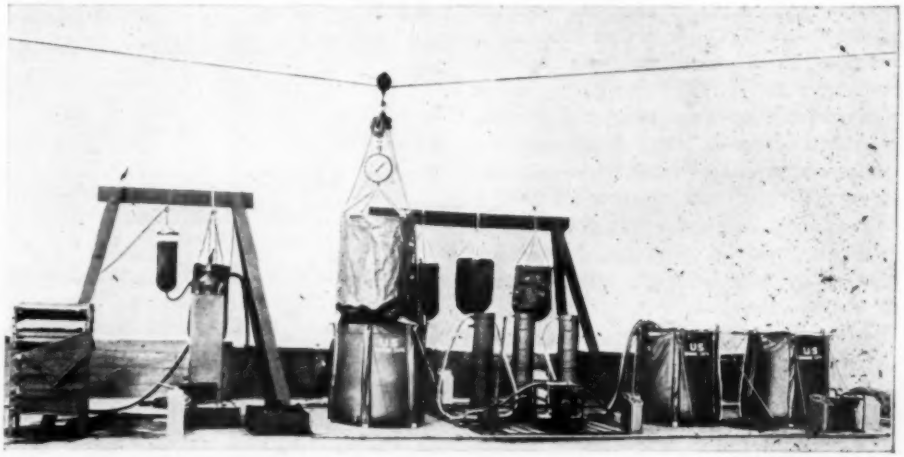
Unlike charcoal, however, the ion exchanger used for totaquina extraction will, when sodium hydroxide is added, reverse its tendency and drop the positively or negatively charged particles. Alkaloids such as quinine behave as cations, carrying positive charges, when in acid solution. This was discovered accidentally by chemists working on the purification of alkaloids.

The fresh cinchona bark, therefore, is cut into small pieces and dropped into an acid in one of the big jungle-green bags and the mash agitated long enough to extract and charge the alkaloids. It is then pumped through the cylinders containing the ion-exchange material. Alkali is added to release the alkaloids; next alcohol is added, and the dark wine-red liquid is poured on the drying screens. From these it is collected as a pinkish powder which can be further refined to white. This is totaquina. Even a tiny pinch has the bitter taste characteristic of quinine.

Totaquina can also be extracted from the bark by treating with acid and alkali alone. This "bathtub" method, as the Army engineers call it, is much less efficient, but can be used with very simple equipment. Old porcelain-lined bathtubs could literally be used, or barrels or pottery jars. Vinegar might furnish the acid. For a small health center it might be efficient enough and the cost would be very low.

Another extraction plant has also been developed by the Army for use with a hand pump instead of a gasoline motor.

All these methods were designed for



PORTABLE PLANT—Totaquina for treating malaria can be extracted from fresh green cinchona bark in the forests where the trees grow with this 1,500-pound, portable extraction plant developed by the Engineer Board, U.S. Army.

HARVESTING—"Quineros" strip cinchona trees of their bark for use in making anti-malaria drugs.

extracting the malaria drugs from fresh, green cinchona bark. This is where a great saving in money is made. The Dutch got quinine from cultivated cinchona trees yielding a high percentage of quinine and growing in accessible plantations. Cinchona trees are native to Latin American countries, but grow in dense forests that can only be reached over rough, muddy mountain trails.

Totaquina and quinine have previously been extracted only from dried, ground bark. That meant, in the case of the Latin America trees, packing the bark out by mule or man-carry over indescribably difficult trails. The bark could not be dried where the trees grow because of the constant rainfall. One ton of the dried bark, which cost $65 to ship from a Latin American port of embarkation to the United States, might not yield as much as 40 pounds of quinine alkaloids. One of the difficult trails is shown on the cover of this SCIENCE NEWS LETTER.

Totaquina has long been known as "the poor man's quinine." Its present cost, when made from dried bark shipped to this country, is $16 per thousand doses, or about one and one-half cents per dose. Most of the 300,000,000 malaria sufferers in the world each year cannot afford any such expensive medicine. If they use totaquina, they use a home-brewed tea and cover the taste, if possible, with alcoholic beverages of some kind, which, incidentally, helps to extract more totaquina.

Quinine, selling at $90 per 1,000 doses when the government last bought any, and atabrine, even at the present government price for large quantities of $4 per 1,000 doses, are also out of reach of the poor people in malaria regions who need a malaria medicine most.

Totaquina can be produced from fresh bark on the spot by the Engineer Board's new method, however, at a cost of $3.80 per 1,000 doses. This is about one-third of a cent per dose, and atabrine bought by individual patients in retail quantities today would cost about four cents a dose. The Engineer Board's third-of-a-cent per dose figure, moreover, is based on U. S. labor costs with the gasoline motor ion exchange process. The "bathtub" process, with native labor, should bring the price down much lower.

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PUBLIC HEALTH

Polio Cases Increase Throughout Nation

➤ INFANTILE paralysis cases increased throughout the nation during the week ending July 21. The total number reported to the U. S. Public Health Service was 369. The total for the previous week was 254.

The 369 figure, however, is considerably below the 568 cases reported for the corresponding week last year.

States reporting the largest increases were New York, New Jersey, Pennsylvania, Virginia, Massachusetts and Texas. Tennessee, where cases had begun to swing up, reported a slight decrease.

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As seeds respire, they will not *germinate* unless they have a sufficient supply of oxygen.

New stainless steel *vacuum containers*, used to carry hot soups and cold beverages for passengers in airplanes, weigh one-half as much as those formerly used and protect the temperature of the liquids at any altitude.

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AERONAUTICS

New Giant Bomber

The B-32 weighs 50 tons, has a speed of more than 300 miles an hour, has four 2200-horsepower motors and propellers nearly 17 feet in diameter.

➤ THE ARMY's newest heavy bomber, the B-32, built by the Consolidated-Vultee Aircraft Corporation in Fort Worth, has been partially stripped of its veil of wartime secrecy.

Designed for a normal gross weight of 50 tons, the B-32 has a speed of more than 300 miles per hour. It has four 18-cylinder, 2200-horsepower Wright Cyclone engines, equipped with eight turbo-superchargers. During the landing run the huge 16-foot, 8-inch Curtiss electric reversible-pitch propellers can be reversed to enable the plane to land on a shorter runway and increase its maneuverability during ground operation. They are the largest-diameter propellers installed on any production airplane.

Physically, the B-32 has a length of 83 feet, 1 inch, stands 32 feet, 2 inches high on retractable tricycle landing gear equipped with dual 56-inch tires on the landing wheel and 39-inch tires on the nose wheel. The spread of the low-drag Davis wing is 135 feet, only a few feet shorter than that of the Superfortress.

The fuselage of the B-32 is an all-metal, semi-monocoque design, covered with a smooth aluminum alloy stressed skin of various thicknesses. At the thinnest point the skin is only 25 thousandths of an inch thick. Eight men comprise the crew, working in forward and after cabins, with a double bomb bay arranged in tandem in the center.

"The B-32 is a roomy and comfortable plane to work in," Convair officials report. "The bombardier's head clearance is about 4 feet, 6 inches. The flight deck is 14 feet, 6 inches long, and has a head clearance of over 6 feet. The cabin is kept cosily warm by heat supplied by the engines. Although originally designed to have a pressurized cabin and central fire control system like that in the B-29, the B-32 has high-altitude oxygen systems to replace pressurization, thereby making it possible for gunners to take their position in turrets at any time. Gun turrets replace the fire control system."

The use of high-altitude oxygen systems eliminates the danger present in a B-29 when it enters "flak alley". If flak bursts through the skin of a Superfortress the decompression is explosive, sometimes blowing crew members through the plexiglas blisters.

The Davis high-lift, low-drag, long-range wing gives the B-32 a very long range. Heated air from the engine exhaust passes through the leading edge of the wing, amounting to nearly 1,500,000 B.T.U. an hour, or enough heat to make 25 average five-room homes comfortable. This heat prevents ice from forming on the wing. The B-32 is a true all-weather ship, capable of flying under conditions that normally would ground any other type of plane.

To the casual viewer, probably the most impressive thing about the B-32 is the giant single tail. A number of types of tail structures were experimented with in the design of the plane, including a twin tail, such as is used on the B-24 Liberator, and the Boeing B-29 tail. Best results were achieved with the B-29 tail design. The Army wanted to use the B-29 tail so that the structures on the two planes could be interchanged. However, in order to give the pilots plenty of rudder for take-off it was necessary to increase the height of the vertical section of the B-29 tail by about five feet. Other minor revisions were also necessary in the elevators and coupling of the tail structures. Thus, while the present tail structure of the B-32 resembles that of the B-29, it is bigger.

As present, rubber boots are installed on the leading edges of the tail structure to break off ice formations that occur at high altitudes. Soon, however, B-32s will be equipped with heated tail structures that prevent the formation of ice, using engine exhaust heat such as that now piped through the wing.

The B-32's hydraulic system, which controls the operation of the oxygen system and some other parts, is powerful enough to raise a passenger automobile 17 stories above ground in one minute. There are about seven miles of wire in the electrical system, ranging in size from 3/22 inch to the size of a man's thumb.

Maintenance on the ground is made easier on the B-32 than on any other four-engine bomber in use today. The four engines are completely interchangeable. A large trapezoidal door at the top of each engine nacelle allows a man actually to enter the engine housing to work on it.

The four engine nacelles or housings are adaptations of a British design called the "power egg." Exclusive on the B-32, engineers found the power egg, with each nacelle ending in a point behind the trailing edge of the wing flap, the most efficient design to use with the low-drag wing. The engine nacelles are divided at the point where the wing-flaps are joined to the wing, so that they do not interfere with flap operation.

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ENGINEERING

Blind Civilians Inspect Precision Roller Bearings

➤ BLIND civilians, with the use of a new electronic precision gaging device, are able to inspect with accuracy the outside diameters of roller bearings, in a plant of the Timken Roller Bearing Company in Canton, Ohio, to determine if they are the exact size required. Three notes from a loud-speaker on the back of the operator's chair indicate whether a bearing passing through the measuring device is of correct size, oversize or undersize.

Diameters of rolls, cones and cups for precision bearings are ground within very close limits of their specified sizes. Each part is then checked for size by operators using electrical or mechanical dial-type indicators. These indicators show any variation in the diameter of the work-piece being checked. Parts with diameters over or under the specified size limit, or parts out of round, are readily detected and removed.

To enable a blind person to do this identical work with the same accuracy, a sound indicator is used on the same type of gage. The small conical loud-speaker mounted on the back of the operator's chair gives a high note if the article is oversize, a low note if undersize, and a "middle" note if dimensions are correct.

The three notes are produced by an electronic oscillator which is controlled by relays connected to three indicator lights of the electronic gaging system. The three lights correspond to the three notes of the sound device. Chief purpose of the lights is to give the lineman a quick visual check on the gage's efficiency. The gage can be made to give both a visual and sound indication as close as one five-millionth of an inch over or under a specified diameter tolerance.

Science News Letter, August 4, 1945

NUTRITION

10-in-1 Ration a Success

Army substitute for monotonous C and K rations for fighting men in the field contains such delicacies as pork and applesauce and fruit bars.

➤ THE ARMY'S famous and successful ten-in-one ration was developed after experience in the African campaign showed the need for special rations during the period between landing operations and the expansion of the beachheads gained, it is explained in a report released by the Senate subcommittee on war mobilization, known also as the Kilgore committee. Senator Harley M. Kilgore of West Virginia is chairman.

It takes from 30 to 60 days to place in operation the B ration, composed of 125 items and requiring kitchen equipment and a long, well-integrated and complex supply system. As a result, troops in offensive operations had to live one or two months or longer on C or K rations. Although sufficiently nourishing, these became so monotonous that the men frequently could not eat enough of them to get enough food for prolonged top efficiency.

Antiaircraft gun crews, searchlight crews and other troops stationed far from the base camp and messing facilities also had to get along on the monotonous C and K rations. Tanks and other vehicles upon reaching their night bivouac are scattered over such wide distances, as a precaution against bombing, that they could not well be fed from regular messes.

These and similar conditions of modern warfare showed that rations developed before Pearl Harbor were not suitable to all circumstances. The Quartermaster Corps got to work, with an appropriation of $50,000 plus research aid furnished gratis by cereal manufacturers and meat packers, and in August, 1943, the first ten-in-one rations were produced.

They met with tremendous enthusiasm when issued to troops in the Italian campaign. These men had fought through the Sicilian campaign of approximately 42 days. During 38 of these days, they had existed on C and K rations, because the B ration could not be moved up any sooner. Their response to the ten-in-one ration in the Italian campaign has been equalled by that of troops using it in the European campaign.

The ten-in-one ration is packed in waterproof asphalt, laminated fiber cartons that will withstand 18 to 24 hours immersion in seawater without any damage to the contents and floats just awash.

Each carton contains rations for 10 men for one day, or for five men for two days, one man for 10 days or any similar combination. There are five separate menus. Latest specifications call for five types of ready-to-eat cereal, 17 different meat items, three different cheese products, five different vegetables, four different types of biscuits and five different beverages.

The biscuits, used instead of bread in combat rations, are highly nourishing and greatly improved in palatability over hardtack.

Outstanding among confections, the Kilgore committee reports, is the fruit bar developed by the Army from the ground up. Nothing in commercial existence even approached this type of product. Because commercial candies would not stand the rigors of high-temperature storage, new types of high-melting chocolate candies and coatings were developed.

The Army had also to initiate the development of new types of canned meats, since few of the commercially available ones were satisfactory for Army use and their variety was extremely limited from an Army viewpoint. As a result there were developed, among others, canned hamburgers, dehydrated corned beef hash, dehydrated meat and rice, pork and corn, improved roast beef, pork and applesauce, ham and raisin sauce, and ham and sweet potatoes.

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ENGINEERING

Transportable Power Plants Being Shipped to Europe

➤ UNIT transportable electrical power plants, complete with generator, steam turbine, boiler and other necessary parts, are being shipped to Europe to furnish power in bombed-out regions to help the return to normal industrial production, it is announced by William E. Knox of the Westinghouse Electric International Company. The units are of two sizes, one with a capacity of 2,000 kilowatts, the other half as large.

The idea of a compact power-producing unit first was conceived by Mr. Knox for use in China, following a trip to that country in 1939. The Chinese, forced back into the interior by the Japs from their coastal industrial cities, needed a quick means of generating electric power for war production. Westinghouse designed units that could operate on locally abundant low-grade coal and models that were built to burn lignite, oil, wood, and even peat.

The European war created another demand. A semi-portable design was perfected that could be assembled in a minimum of time. To meet the emergency requirements of rehabilitation a design was made that simplifies the arrangement of the major parts and eliminates all dispensable refinements.

Westinghouse unit steam power plants of various types have been purchased for use in Russia, Italy, the Netherlands, French North Africa, China and South America, he said. In the Netherlands they are furnishing power for electrical equipment to pump back into the sea the salt waters let in when the Nazis destroyed the protecting dikes.

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ORDNANCE

Tear-Gas Grenade Has Baseball's Size and Shape

➤ A NEW BASEBALL grenade, that any young American can throw without training because he already knows how to peg one from center-field to home-plate, has just been adopted by the Army's Chemical Warfare Service. It is charged with a new-type tear-gas, and is intended primarily for use by the Corps of Military Police, in dispersing mobs and quelling incipient riots.

In use, the grenade is grasped in the hand, with thumb or index finger over a projecting plug. The soldier pulls a safety pin, then throws the grenade exactly as he would a baseball. As soon as the missile leaves his hand, the plug is forced out by a spring, and a two-second fuse is set in action.

When the fuse functions, it explodes a very small bursting charge, just sufficient to break the thin plastic casing like an eggshell and scatter the tear-gas contents in the form of an invisibly fine powder spray or aerosol. Action is instantaneous; there is no chance for members of the crowd to run out of range, as sometimes happens with the present slower-fuming tear-gas grenades.

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CHEMISTRY

Tung Oil Replacement

Pentaerythritol, that puts the bang in bazooka, will have major peacetime use in varnishes and resins. Much less expensive than tung oil.

➤ THE same stuff that puts such a "bang" in the bazooka's tank-killing rocket projectiles, given different chemical handling, becomes an excellent material for varnishes and other coating resins, at least partially replacing the war-scarce tung oil.

The compound's name is pentaerythritol. Although it is a dry white powder at ordinary temperatures, it is chemically classified as an alcohol. It is made synthetically from formaldehyde and acetaldehyde, which themselves are synthetic compounds, so that its supply is not so likely to be diminished or disturbed by either war or weather as are supplies of imported natural products like tung oil.

Moreover, it is relatively low-priced. In 1940, drying oils based on pentaerythritol could be bought for 11 to 15 cents a pound, while tung oil was selling at 18 to 24 cents a pound. Since war demands have brought about a great increase in pentaerythritol production, it is likely that this favorable price differential can be increased when it is no longer needed for loading rockets, shells and mines.

As used in bazooka projectiles and other military missiles, the compound has four nitrogen-containing atomic groups attached to it. These convert it into pentaerythritol tetranitrate, referred to as PETN for convenience; this is an explosive so violent that TNT is usually added to it to slow it down a little, and make it less "touchy".

For use as a varnish, pentaerythritol is combined with rosin acids, fatty acids or other organic chemicals. Thus treated, it is said to be able to hold its own in competition with the older coatings made with tung or other vegetable oils.

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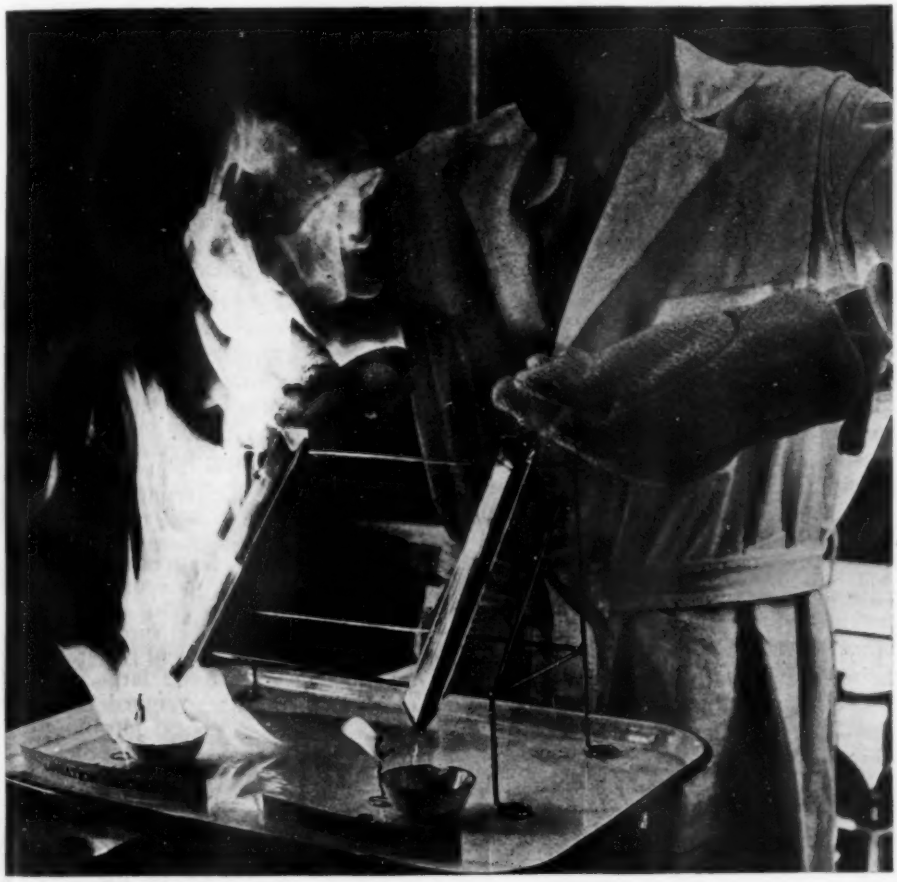


SAFETY GAS—On the right is the new fuel produced by the Standard Oil Company, New Jersey. The safety feature is due to the fact that inflammable vapors are not produced in large quantities in the air. When a match is dropped into ordinary gas (left), a fire results.

CHEMISTRY

Lighted Match Can Be Put Into New Safety Fuel

➤ A NEW safety fuel for aircraft, so resistant to accidental ignition that a lighted match can be dropped into it without causing a fire, was announced and its properties demonstrated to a group of scientists in New York. It has all the power of 100 octane fuel, extended tests in a high-powered airplane engine show.

The new safety fuel is a development of the Standard Oil Company of New Jersey, and the demonstration was made by technical men of that company and of Pan American World Airways. The chief engineer of the latter company pronounced it to be "an important technical advance in aviation."

The safety feature of the new fuel is due to the fact that it does not form inflammable vapors in the air in great enough quantities to ignite, unless it is at temperatures above 100 degrees Fahrenheit. Ordinary motor and aircraft gasolines do, and they ignite readily and burn rapidly because of the vapors formed.

The new fuel, however, must be fed into the engine by direct injection rather than by ordinary carburetion such as is used with conventional gasolines. Unless suitable carburetors are developed, engines now in use will have to be converted for fuel injection if the new fuel is to be used. After the fuel is injected in the cylinder, it is vaporized by the heat developed during compression. The fuel mixture is fired by the conventional spark plug.

Science News Letter, August 4, 1945

Gallium, a little known chemical element, is 150 times as abundant as silver.

Expansion spaces between the ends of the rails on a railroad are not necessary if the rails are welded and rigidly confined against buckling; the rails merely develop compression in heat and tension in cold, but both within safe limits.

MEDICINE

Backache in Some Cases Relieved by Operation

➤ SOME of the many backache sufferers in the world may have their pain because a small tumor of fat has bulged, like a hernia or rupture, through the bands of tissue covering the muscles in the lower back.

In six such cases, some with such severe pain they could not get out of bed or turn over, operation to remove the fat tumor brought speedy relief, Dr. Ralph Herz of Cleveland reports. (*Journal, American Medical Association,* July 28)

The operation is not a panacea for all types of backaches, he warns. There are many causes of back pain for which there are standard treatments. In many cases, however, the cause remains hidden in spite of careful searching, and these patients go on having their backaches with little or no relief from the usual treatments. In some of these, perhaps a fairly large proportion, Dr. Herz suggests, the cause may be the fat tumors herniating through the bands of tissue that cover and connect muscle, known as fascia.

The little tumors or masses can usually be detected by feeling for them. Pressure on them produces the sever pain the patient has complained of, including in some cases radiation of the pain down the leg. Injections of anesthetic solution around the mass or tumor bring prompt but temporary relief of the pain. This relief following injection of anesthetic, however, confirms the diagnosis.

After Dr. Herz had operated on three patients he found that Drs. W. S. C. Copeman and W. L. Ackerman had reported 10 similar cases among men in the armed forces. All of these patients also had striking relief after the fatty tumors had been removed.

Science News Letter, August 4, 1945

NUTRITION

Electronic Blanching Destroys Less Vitamin

➤ A REVOLUTION in the preparation of fresh vegetables for either quick-freezing or dehydration is pending, if experiments carried on at the New York State Experiment Station by Dr. James C. Moyer and Dr. Elmer Stotz prove applicable on a commercial scale.

A necessary step in the processing of vegetables for either type of preservation is known as blanching. It consists in a brief application of heat to stop the action of the plant's own enzymes, which would otherwise produce a kind of self-digestion, spoiling both flavor and food value. Blanching is now done either by steaming or dipping in scalding water.

Because both present methods of blanching cause material decreases in the vegetables' content of vitamins, especially carotin and ascorbic acid, Drs. Moyer and Stotz decided to test the possibilities of electronic heating. They exposed samples of shredded cabbage to the action of a high-frequency field for two and one-half minutes, while similar samples from the same head were put through the conventional steam and hot-water blanching processes.

Tests for ascorbic acid, before and after blanching, showed that whereas the samples treated with steam lost 32% of this important vitamin, and those scalded in hot water lost 40%, the electronically blanched cabbage lost only 3%.

In announcing the results of these preliminary experiments (*Science,* July 20) Drs. Moyer and Stotz state also that they have tried out their method on other vegetables, and that further and more extensive studies are now in progress.

Science News Letter, August 4, 1945

METALLURGY

Magnesium Smelted Right Out of Silicate Ores

➤ MAGNESIUM, the light metal that has revolutionized airplane construction since the beginning of the war, can be smelted directly out of magnesium-silicate ores by a new process on which U. S. patent, 2,379,576 has been issued, to Dr. Fritz J. Hansgirg, Austrian-born metallurgist who has already made notable contributions to American war industries. Dr. Hansgirg is at present carrying on his researches at Black Mountain College, in North Carolina.

The siliceous ore is crushed and mixed with powdered coke, and the mixture is pressed into tablets with coal tar as a binder. The tablets are heated in a rotating kiln, until the silicon comes out of the compound in pure elemental state, leaving the magnesium still combined with oxygen. The partly reduced ore is again pressed into tablets, this time with the addition of calcined lime. Heated to a high temperature in a high-vacuum retort, the silicon combines with the oxygen of the partly reduced ore and with the lime, forming calcium silicate, which is useful in glass-making. The magnesium comes out as the pure metal.

Science News Letter, August 4, 1945

IN SCIEN

MEDICINE

Penicillin Fails as Spotted Fever Remedy

➤ HOPE that penicillin might prove an effective remedy for Rocky Mountain spotted fever seems considerably dimmed by a study reported by Dr. Florence K. Fitzpatrick, of the medical research division of Sharp and Dohme (*Science,* July 27).

Six guinea pigs infected with the disease were given penicillin in amounts believed large enough to bring about recovery if the mold chemical had any value in this disease. All six died. Of 16 infected animals getting no specific treatment, eight survived and eight died. Another six were given spotted fever rabbit immune serum. All these survived.

Science News Letter, August 4, 1945

ENGINEERING

Fluorescein Detects Leaks In Pipeline Under Channel

➤ THE CHEMICAL compound, fluorescein, used by airmen forced down at sea to color the surface water around their rubber rafts and mark their locations, also played an important part in locating leaks in the pipelines laid under the English Channel from England to France to supply the Allies in Normandy with gasoline and oil.

Fluorescein on the surface of seawater produces a large colored patch visible at great distances to patrolling aircraft or surface ships. It occurred to authorities that a solution of the same chemical pumped through a fractured pipeline would rise to the surface of the water at the break, thus revealing its position.

The scheme proved successful, although a special solution of the chemical had to be developed and large quantities prepared. It was pumped into the English end of a damaged pipeline, and in due time aircraft and ships noted a large colored patch on the surface that located one end of the broken pipe. To locate the other end of the break, quantities of the solution were taken to France and pumped into the French end of the line. With the two ends of the fracture located, repairs were easily made. The method was employed several times on later breaks.

Science News Letter, August 4, 1945

E FIELDS

PLANT PATHOLOGY

Sulfur Compounds Check Fungi Causing Orange Decay

➤ ORANGES may be prevented from decaying, with consequent large savings both nutritional and financial, by means of several sulfur-containing organic compounds investigated by Dr. J. F. L. Childs and Dr. E. A. Siegler, of the U. S. Department of Agriculture, at the Federal experiment station at Orlando, Florida (*Science*, July 20).

Most of the storage and market spoilage of oranges is traceable to two kinds of fungi that cause stem-end rot and two others that are known respectively as blue and green molds. Damage by all four of these fungi was cut down very materially by three compounds, all characterized by the presence of sulfur in combination with nitrogen-containing atomic structures known as amino groups.

Untreated lots of oranges exposed to the same conditions of infection underwent decay in percentages ranging from 32.9 to 42.2. Oranges treated with a 5% solution of thioacetamide produced only 1.7% of decayed specimens. Treatment with 8-hydroxyquinoline sulfate and 2-aminothiazole, in the same strength, was not quite so effective, but still reduced decay to a fraction of what it was in untreated oranges.

Science News Letter, August 4, 1945

PLANT PATHOLOGY

Brown Berry Proven to Be Serious Virus Disease

➤ BROWN BERRY, a plant ailment attacking black raspberries, and hitherto regarded merely as a physiological response to unfavorable environmental conditions, is actually a serious virus disease, Dr. George L. Zundel of the Pennsylvania State College has discovered. He has also found that mild streak, long considered a distinct disease and known to be caused by a virus, is another symptom of the brown-berry infection.

For the present, Dr. Zundel thinks, plant pathologists will apply the hyphenated brown berry-mild streak combination name to the disease, and that later a more appropriate name may be devised.

Not satisfied with the accepted belief that brown berry resulted from drought, frost, lack of pollination, or some other "catch-all" environmental factor, Dr. Zundel made a study of the disease. This led to observations which later were confirmed through grafting operations with the aid of experiment experts.

Although satisfied that environmental conditions alone do not cause the disease, Dr. Zundel does not rule out the possibility that environment plays a role in its development since the disease has been observed more generally in low places and near wooded areas.

Because the disease does not strike entire raspberry patches uniformly, Dr. Zundel prefers to leave it to the grower's judgment as to whether he wants to rogue out all of his plants, or just those most severely affected. Plants less seriously affected, he reasons, may return at least a part of a crop while new and disease-free plantings are getting established elsewhere.

Roguing out, he explains, is the most effective control measure, followed, of course, by the use only of plants that are known to be disease-free. Where stock is obtained from nurseries which do not originate their own plants, he advises tracing the plants through all handlers to their origin.

Science News Letter, August 4, 1945

INVENTION

Yoke-Type Life Preserver For Soldiers at Sea

➤ AMERICAN soldiers crossing the ocean on transport vessels are now being provided with a new yoke-type life preserver, designed to wear with full infantry equipment, developed by the U. S. Navy. It is made of kapok, and will replace the present carbon dioxide dual-tube life belt which is worn with difficulty by a soldier laden with a full pack and equipment.

The new preserver, perfected as a result of extensive tests, is worn over the neck and is adjusted by combination leg and waist straps. A soldier's pack can be removed without taking off the life preserver. Also the preserver can be removed without interfering with the pack. It will support a man in the water equipped with helmet, rifle, ammunition and pack.

Because of the scarcity of kapok and other materials used in its manufacture, the new preservers are issued only to troops in troop-carrying vessels.

Science News Letter, August 4, 1945

SEISMOLOGY

Carolina-Georgia Area Reports Earthquake

➤ THE EARTHQUAKE reported from towns over a fairly wide area in the western Carolinas and northern Georgia on Thursday, July 26, apparently was one of a long succession of mild shocks that have been felt from time to time in the Southern Appalachians, seismologists of the U. S. Coast and Geodetic Survey told Science Service. From there, the spots on the epicenter map "scatter out like birdshot" up the whole mountain system as far as New England, then swing towards the northwest, up into the Canadian highlands.

None of these earthquakes in the southern mountains has ever been reported as serious.

Quite different was the story of the Southeast's one really major earthquake, which hit Charleston, S. C., in 1886. This was a real "smasher", and it practically wiped out the city. This, however, seems to have been strictly a coastal-plain affair, having no connection with geological events in the mountains.

Ever since the Charleston earthquake, there have been minor tremors from time to time, centering in the immediate neighborhood of Summerville, about 25 miles northwest of Charleston.

Science News Letter, August 4, 1945

GENERAL SCIENCE

Boys and Girls Exceed Milkweed Floss Quota

➤ CREDITING the assistance of the Science Clubs of America with its 7,000 clubs in the nation's high schools for a part in the achievement, the War Administration has announced that the program last year for the collection of milkweed floss was entirely successful. More than 1,700,000 pounds of the floss were gathered, whereas the quota set by the War Production Board was 1,500,000 pounds. Milkweed floss was needed as a substitute for kapok for use in life preservers.

In the past few months the situation has changed materially as substantial quantities of kapok are now being received from the Philippines and other South Pacific islands. These supplies, together with the milkweed floss on hand, are expected to take care of the situation permanently.

No milkweed pod collecting program for 1946 is being planned as a result.

Science News Letter, August 4, 1945

PHYSIOLOGY

Working in Comfort

Heat, but also moisture in the air, wind and your own activity contribute to summer discomfort. High pulse rate a danger signal.

By MARTHA G. MORROW

➤ TO BE comfortable in the summer's heat, you work only about one-fifth as hard as you would if you were doing your utmost. That is science's latest finding.

People begin to feel uncomfortable, and want to slow down on the physical exertion, when they are doing only one-quarter of what they are humanly capable of doing. But if they keep on going, they will soon get their "second wind" and can continue to work without discomfort.

A person's comfort as far as physical activity is concerned—and comfort is very important to all of us—can actually be measured, the Quartermaster Corps of the Army found while trying to determine how much work our soldiers could safely do in different climates. They found that a person's degree of comfort is the ratio of what a man is doing in a given environment to what he can do in that same environment.

Irrespective of whether a person is taking violent exercise on a cool summer day or whether he is sitting still when the day is oppressively hot, a person's comfort increases with the amount of heat the air can take up from his body and his comfort decreases with the heat that is generated by his body.

The high relative humidity of the air, which many of us take as a signal on a hot day for complaining about the heat, may mean that it will probably rain, but has little real relation to how we feel. What is important to us is the actual amount of water vapor in the air, or absolute humidity.

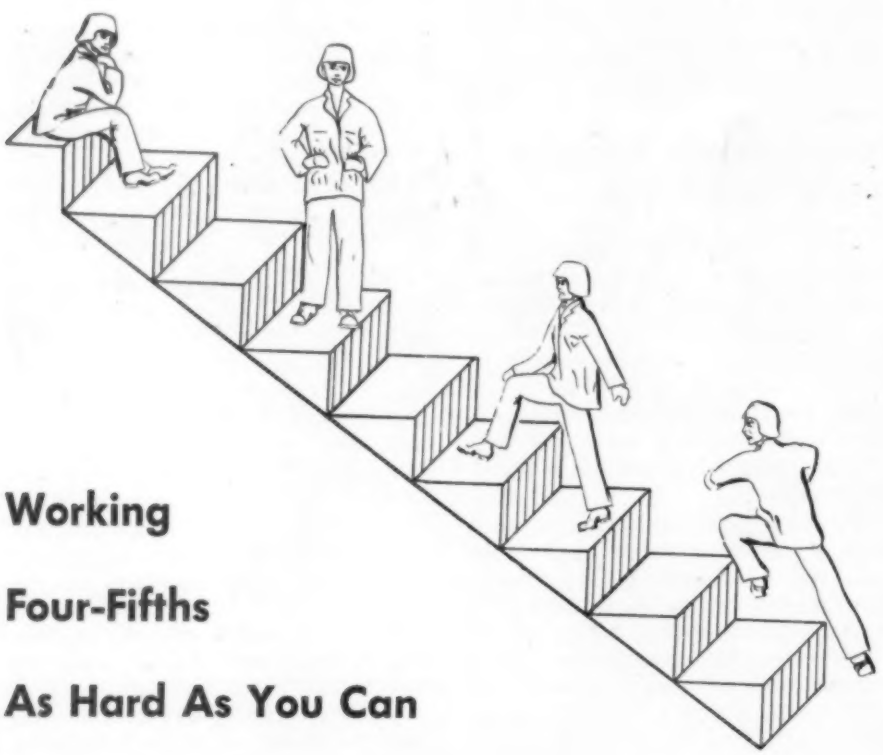
It is almost twice as hard to evaporate the moisture from your body when the temperature of the atmosphere is around 90 degrees Fahrenheit as it is when the temperature is at 70 degrees, even though in both cases the relative humidity is 90%, because the absolute amount of moisture in the air is greater in the first instance than in the second.

The amount of heat created by the human body in digging a ditch, marching, driving a truck, just sitting still or sleeping must be lost into the surrounding air, or a person will suffer. If the air temperature is cooler than the body, this heat may be carried away by the convection currents of wind, by evaporation of sweat, or by radiation to cold ground or sky. If the air temperature is about that of the body, wind and sun will add heat, but evaporation is usually able to dispel it too.

Moisture Loss Serious

The amount of moisture that a person loses through the evaporation of sweat can be measured by his loss in weight. Under comfortable conditions, men give off about 50 grams (that's slightly less than two ounces) of moisture an hour. When they lose as much as 450 grams or about 16 ounces an hour, they begin to get uncomfortable. But if these same men can get plenty of water to drink, they can lose as much as 1500 grams or about 3½ pounds of moisture an hour without suffering any serious difficulties.

Danger points, beyond which a person should not go for safety, have been determined by a group of experts at the Quartermaster Corps as follows: When the pulse rate reaches 130 to 140 beats a minute—watch out. Even if a person is drinking plenty of water, when he is sweating away 1500 grams of moisture an hour, he should cease whatever he is doing and rest for a while. Another danger point is reached when the rectal temperature, which pretty well shows the temperature of the interior of your body, reaches 101.4 degrees Fahrenheit. Danger may be reflected in these ways or several others, but any one of them should serve as warning. A man can go above these warning regions without harm for



MOUNTAIN CLIMBING—Although the temperature may remain at 97 degrees Fahrenheit, as the amount of moisture in the air increases, the amount of physical labor which a man can safely do rapidly decreases, as shown in this Army chart from the office of the Quartermaster General.

short periods, but it is dangerous for him to continue there long.

These danger points may find a practical application in industry or the services. An officer on the march would know that his men must have a rest, for instance, when their pulse rate gets beyond 130 beats a minute. A steel expert might require his men to leave the heat of the steel furnace when they have sweated away more than a certain amount of their weight for that day.

Even a warm wind cools you, unless you are enduring severe desert conditions. A layer of still air is around everything, clinging close to your arm, pocketbook or table top. Wind erodes the layer of still air and takes away part of the insulation from your body. As long as the temperature of the air is cooler than that of the body, the wind cools you.

On a hot day when the temperature of the air is warmer than that of your body, eroding the layer of air would tend to make you hotter, because it brings the hot air closer to the body. But at the same time the hot wind increases the speed with which moisture is evaporated from your body, which in turn tends to cool you off. In the desert when there is a high wind, however, this is no longer true because then the wind may be demanding from the body more sweat than the body can produce and a person will get the full heating effect of the hot wind.

Damp Clothes Cooling

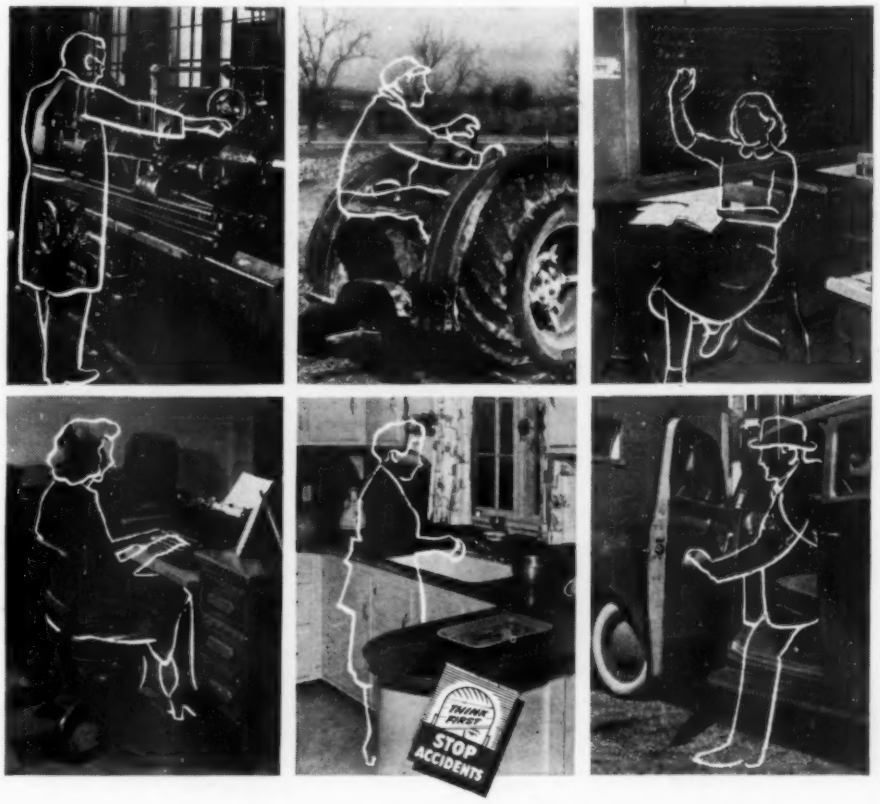
Clothes reduce the amount of heat that can be transferred to the cooler surrounding atmosphere in jungle or humid heat and thus tend to make a person hotter—this is an argument in favor of the now-popular bare legs which women are enjoying as even sheer stockings trap a thin layer of air between the stockings and the legs.

If the clothing is damp, however, and sticking to the body, a person may get almost the full cooling effect of the moisture evaporation. In the full blast of desert heat, and when the man is not exercising energetically, clothes may be a positive help, as they form a resistance barrier to the flow of hot air toward the body. Don't start out without hat or shirt to drive in an open car or jeep across New Mexico or Arizona.

People who are accustomed to the climate will begin to feel uncomfortable indoors, even if they are themselves just sitting in their office, when the relative humidity is 90% if the temperature gets above 87 degrees Fahrenheit. Or if it drops to 83 degrees, with the same relative humidity, in absolutely still air, like that of a telephone booth, they will begin to feel almost unbearably hot. They will also be uncomfortable under either of these conditions if they begin to do violent exercise.

On one of these hot summer days if the temperature is 90 degrees and the relative humidity 80%, an office executive doing the usual amount of getting up from his desk, walking around and conferring with others, will be between just plain hot and oppressively so, and probably wish he could think up some excuse for leaving early.

If the thermometer continues to hover around 90 that evening, however, and the amount of moisture in the air remains the same, this same man can play a couple of sets of tennis around six o'clock with a not-too-good opponent without being any worse off, provided the sky is overcast. By running around the court, he will have increased his wind velocity enough to counterbalance for a time the added exertion. But if this same man attempted to play tennis at about two that afternoon, with the



Out of action... *because they didn't see*

More than 350,000 deaths, 1,300,000 permanent disabilities suffered since Pearl Harbor—more than the total of all casualties caused by enemy action—are *due to accidents* in traffic, at home, on the farm, at work. One reason for this appalling toll on needed manpower is faulty eyesight.

You may have visual handicaps of which you are not aware; or you may have vision ideally suited to certain tasks but not to others. Modern optical science has proved these facts, and has developed scientific techniques for correction of almost all visual defects.

"I didn't see" is a poor excuse for anguish to you or your family. Don't take a chance! Only a professional visual check-up can reveal the true condition of your eyesight.

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Do You Know?

Sittard in the Netherlands is supposed to have got its name from Napoleon, who upon his arrival there, according to the story, said "si tard", or "so late."

Toughness in *meat* may be due to the age of the animal when slaughtered, or to the diameter of muscle fibers and of muscle-fiber bundles, and the proportion and distribution of fat within the muscle.

When *alum* is added to raw water it forms little particles, positively charged, which attract to themselves the negatively charged dirt particles, thereby clarifying the water as they settle.

Owing principally to an increase in soda ash and chlorine production, the total output of common *salt* in the United States in 1944 exceeded 16,000,000 tons.

Tetanus antitoxin, used to prevent lockjaw, is an antibody obtained from the blood of horses; unless renewed it gives the human body only ten days' protection.

Corn grown on soil containing the proper fertilizing elements produces a higher percentage of grain to cob than corn grown where these elements are deficient.

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sun beating down upon him, he would be sweltering close to the limits of safety.

A 150-pound soldier carrying a 40-pound pack and marching at three miles an hour under jungle conditions, with no wind blowing, except that created by his body, will be extremely uncomfortable at a temperature of 85 degrees, with 90% relative humidity, whereas a man without a pack would not be as uncomfortable, with the same amount of moisture in the air, until the temperature hits 95. If the GI, on the other hand, received a letter from his girl friend saying she had married someone else or if he hadn't slept well, he might have had to put down his pack before the four hours were up, or drop exhausted.

No conditions anywhere in the world are so bad that you can't walk around and do some shoveling. In the City Deep Mine (recently air-conditioned), Witwatersrand, South Africa, the relative humidity was usually 100% and the temperature about 96 degrees. Yet comparatively few natives were unable to get accustomed eventually to the conditions and work in the mine.

Climbing mountains is considered about the hardest work a person can do as the weight of the human body must actually be lifted from one place to another. When the wind is blowing five miles an hour and the relative humidity is 100%, if the temperature rose above 85 degrees, the man climbing a steep mountain without rest would drop exhausted. Should the temperature rise to 90 degrees and the relative humidity drop to less than 50%, he would have reached his upper limit of comfort and mountain climbing would have become just plain hard work.

When the temperature is around 70, if the wind is blowing at five miles an hour, the relative humidity doesn't matter much because the pressure of the vapor upon your body is low and the wind velocity is great enough to take away the body sweat.

When the wind drops to one mile an hour (such as you get indoors with a fan in the same room, but not turned directly on you), however, a man doing gymnastics in only shorts and shoes would be affected by the moisture in the air unless the temperature dropped to about 60 degrees.

A number of laboratories throughout the country have been studying the amount of work a soldier or civilian can comfortably do under special conditions, but it was at the office of the Quartermaster General in the Climatology Section where Major Paul A. Siple, Dr. Jesse H. Plummer, and Margaret Ionides brought all this information together and correlated it.

The basic information, they state, came from research conducted at the John B. Pierce Laboratory of Physiological Hygiene at New Haven, Conn., but it was necessary to correlate it with the work done by Dr. Sid Robinson, Department of Physiology, University of Indiana, and by many others before it could be used for so many different activities and temperatures.

The temperature of the air, velocity of the wind, vapor pressure (amount of moisture in the air), and the kind of activity a person is doing all influence his comfort. But other factors such as individual differences, acclimatization, dehydration and combat fatigue are also important, worthy of further study and can be analyzed by the same method, experts believe.

After more data have been secured, they state it will be possible to tell a "weak sister" from a "strong brother" and give these differences a numerical value.

Science News Letter, August 4, 1945

NEW "PICK-UP" CANE

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BOTANY

NATURE RAMBLINGS

by Frank Thone

Many in One

► LATE SUMMER is the time of the Compositae—that great botanical family that comprises such diverse plants as sunflowers and asters, thistles and ironweed, goldenrod and coneflower, and even cocklebur and ragweed. True, there are plants belonging to this group that begin blossoming early—few spring flowers show their faces before the dandelion, for example—but in general the composites really get going after the sun starts on a southward trek, and keep it up until frost ends the show.

It may surprise persons who are not specifically trained in botany to hear of plants that look so little alike as wild aster and cocklebur as being in the same family. The kinship, however, is pretty well established, and is based primarily on one thing: the tight grouping of a number of small units which are the single flowers into one collective or composite flower head. Whence, incidentally, the name *Compositae*.

The makeup of a composite flower head can be probably most easily studied by taking apart a specimen of the largest of them—a sunflower. Cut or break the big disk of a sunflower in two, and pry out a few of the separate units you will find set in it. You will find that each of these units, which is eventually going to be a sunflower "seed", carries at its top a set of stamens and a two-parted stigma, or pollen-catching organ, and that there is a pair of short chaffy scales outside of these. This is all that remains of the showy parts of the flower, except in the row of units around the rim where the so-called ray flowers are. Here the petals survive; but what appears to be one big petal is really five, joined edge to edge and spread out flat.

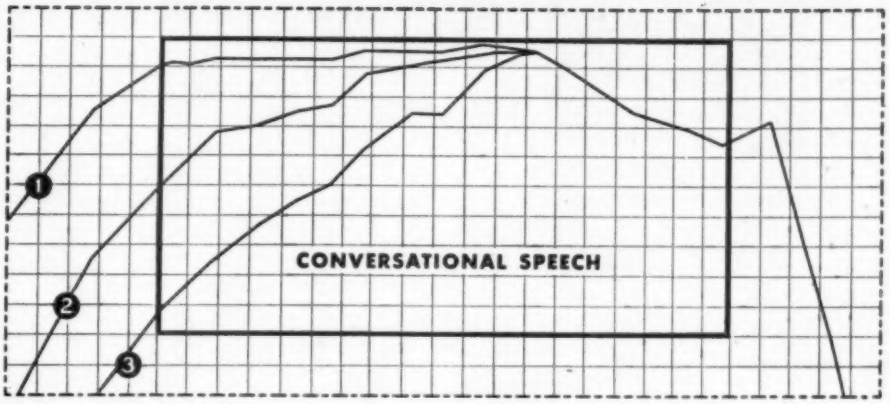
That is a condensed (possibly over-condensed) description of the flower-arrangement in just one kind of composite. There are many variations. The bushy purple head of a thistle, for example, has flowers all alike all over the disk. They all have petals, but these are united into a narrow tube instead of being split along one side and spread out flat, as in the sunflower's ray-flowers. And obnoxious weeds like cocklebur and ragweed have no recognizable petals at all. The number of individual units, or flowers, in a head varies greatly, from several hundreds in a big sunflower down to a few dozens in a wild aster, or even to fewer than that, in the small flower-heads of some of the goldenrods.

Science News Letter, August 4, 1945

The U. S. *Mint* turned out during 1944 approximately 8,000,000 coins for more than a score of friendly nations.

Specially treated *cotton*, made flame-resistant and water-repellent, will probably have wide use in the future for insulation purposes because it is light and highly resistant to the passage of heat.

What Makes a Good Hearing Aid . . . No. 2 of a Series



1 For level amplification over a broad band of frequencies
2 For moderate elimination of low frequency sound
3 For almost complete elimination of low frequency sound

FUNCTION of the TONE DISCRIMINATOR

● A tone discriminator is a requisite of a good hearing aid. It is an engineering refinement that makes for more efficient correction of the varying types of hearing loss.

With nerve or mixed impairments, the hard of hearing can hear low frequency sound—need amplification of high frequency sound. A tone discriminator should give selective elimination of low frequency sounds for a more balanced correction of such hearing impairments.

With conductive type of hearing loss, the hard of hearing often find room noise, office clatter, traffic rumble and other low frequency noise distracting. A tone discriminator should enable them to "tune out" or reduce these annoying low frequency noises—and still hear speech and other desirable higher frequency sounds.

The chart above shows how a well-engineered tone discriminator should moderate or almost entirely eliminate undesirable low frequency sounds, while desirable higher frequency sounds are still amplified for clarity.

THE WESTERN ELECTRIC is one hearing aid that has been engineered with a practical, readily adjustable, three-position tone discriminator of the type shown in the chart.

THIS SERIES, BASED UPON RESEARCH CONDUCTED BY BELL TELEPHONE LABORATORIES, IS PUBLISHED IN THE INTEREST OF THE HARD OF HEARING AND THEIR PHYSICIANS.

Western Electric Hearing Aids

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PSYCHIATRY

Better NP Care Planned

Ways proposed for taking care of veterans and servicemen with limited facilities. Would give courses to general practitioners.

WAYS of stretching and increasing the nation's psychiatric resources to meet present and future needs, particularly those of servicemen, are proposed in a series of recommendations from representative psychiatrists and other physicians and announced by the National Committee for Mental Hygiene.

Even if no more than 50,000 to 150,000 of the men discharged from the Army and Navy or rejected by Selective Service for psychiatric disabilities turned to psychiatrists for help, it would be impossible to care for them with present resources. The number of these men needing such care is estimated at more than 2,000,000.

Following a conference of 30 physicians and community workers, at which Army, Navy, Public Health Service and Veterans Administration officers were present, a five-man committee drew up recommendations briefly as follows:

1. More psychiatric training of medical officers in the Army and Navy where such training in short courses has already proved highly successful.

2. An impartial restudy of treatment facilities and policies of the Veterans Administration and of legislation regarding compensation for veterans with psychoneurotic reactions. Compensation has a direct bearing on treatment in such cases, it is pointed out.

3. For emergency action, development in military installations of more facilities other than hospital care for treating men with psychoneurotic reactions. The hope is that by such means, including mental hygiene units, many more men can be retained in service for treatment which is not now available in civilian life.

4. Intensified effort by the National Committee for Mental Hygiene to arouse and inform the public on the needs of veterans with psychoneurotic reactions, the NP cases.

5. Prompt setting up of courses for general practitioners on emotional disorders, technically called neuroses, and their care.

6. For the long-range problem, various procedures for increased training of physicians and medical students in the psychiatric aspects of medicine and of psychiatrists in the treatment of patients who are not in mental hospitals and in the use of auxiliary personnel and community services.

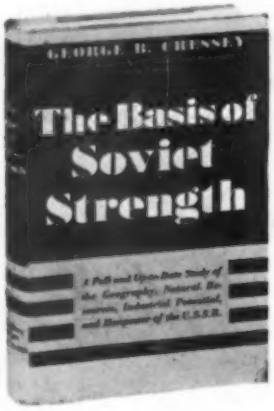
The demand for psychiatric care is likely to increase rather than grow less and to be particularly pressing if unemployment becomes widespread, in the opinion of physicians attending the conference.

The committee which drew up recommendations based on the conference discussion was made up of Dr. David P. Barr, Cornell University Medical College; Dr. Walter L. Palmer, University of Chicago School of Medicine; Dr. Thomas A. C. Rennie, Cornell University Medical College; Dr. George S. Stevenson, the National Committee for Mental Hygiene; and Dr. George W. Thorn, Harvard Medical School.

Science News Letter, August 4, 1945

Annual *"ham-and-egg" shows* are held in several Southern states where Negro farmers exhibit home-cured hams and newly laid and preserved eggs; the idea originated with a Negro agricultural extension worker 30 years ago.

American *mountain lion,* known also as cougar, panther, puma and catamount, is one of the largest predatory animals of the United States and kills annually many deer, calves, colts, lambs and young goats.



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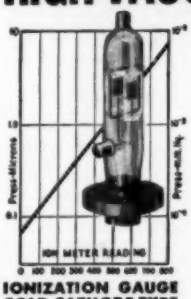

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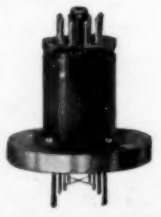

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• Books of the Week •

ADULT ADJUSTMENT: A Manual on the Coordination of Existing Community Services and the Establishment and Operation of Community Adjustment Centers for Veterans and Others—Morse A. Cartwright and Glen Burch—*Inst. of Adult Education,* 84 p., illus., $1.50.

AMERICAN GEOPHYSICAL UNION TRANSACTIONS OF 1944: Part V. Section of Hydrology Reports, Twenty-fifth Annual Meeting—*National Research Council,* 157 p., illus., paper, $1.50.

AMERICAN GEOPHYSICAL UNION TRANSACTIONS OF 1944: Part VI. Section of Hydrology Papers, Twenty-fifth Annual Meeting—*National Research Council,* 233 p., illus., paper, $2.

CAST IRON IN THE CHEMICAL AND PROCESS INDUSTRIES—F. L. La Que—*Gray Iron Founders' Soc.,* 27 p., paper, $1. Information on the properties and applications of gray cast iron.

DEVELOPMENTAL PSYCHOLOGY, An Introduction to the Study of Human Behavior—Florence L. Goodenough—*Appleton,* 723 p., illus., $3.75. 2nd ed., revised and enlarged.

HOW TO CASH IN ON YOUR DISCHARGE BENEFITS—Max D. Novack—*Wise,* 97 p., paper, illus., $1. The legal rights of the returning serviceman.

A MANUAL OF THE ASPERGILLI—Charles Thom and Kenneth B. Raper—*Williams & Wilkins,* 373 p., illus., $7. For the laboratory worker.

THE MAYA OF EAST CENTRAL QUINTANA ROO—Alfonso Villa R.—*Carnegie Institution of Washington,* 182 p., paper, illus., $2.25. Publication 559. Cloth binding, $2.75. A description of the mode of life of the descendants of the Maya Indians who made no peace with the Whites.

NEW CROPS FOR THE NEW WORLD—Charles Morrow Wilson, ed.—*Macmillan,* 295 p., illus., $3.50. The progress of inter-American agriculture.

PIONEER SETTLEMENT IN THE ASIATIC TROPICS: Studies in Land Utilization and Agricultural Colonization in Southeastern Asia—Karl J. Pelzer—*Am. Geographical Soc.,* 290 p., illus., $5. This study has been made with the cooperation of the Secretariat of the Institute of Pacific Relations. International Research Series.

SECRETS OF INDUSTRY—Lewis C. Ord—*Emerson,* 255 p., $3. An analysis of the requirements and techniques of industrial efficiency.

STUDIES IN BIOPHYSICS: The Critical Temperature of Serum (56°)—Lecomte Du Noüy—*Reinhold,* 185 p., illus., $3.50.

TALKING WAX, or the Story of the Phonograph—Leroy Hughbanks—*Hobson,* 142 p., illus., $1.50. Written in non-technical language for general readers.

YOUTH AND YOUR COMMUNITY—Alice C. Weitz—*Public Affairs Committee,* 31 p., paper, 10 cents. Prepared in cooperation with the Youth Conservation Committee of the General Federation of Women's Clubs. Public Affairs Pamphlet No. 108.

Science News Letter, August 4, 1945

MEDICINE

Cigarette Habit Doesn't Depend on Nicotine

➤ NICOTINE is a major factor in the cigarette habit of many persons, but for many other persons it is not. So conclude Drs. J. K. Finnegan, P. S. Larson and H. B. Haag, of the Medical College of Virginia, on the basis of a study reported in *Science* (July 27).

"Even in those in whom nicotine has become a major factor, we feel that a cigarette containing no nicotine would be grudgingly accepted as better than no cigarette at all," they state.

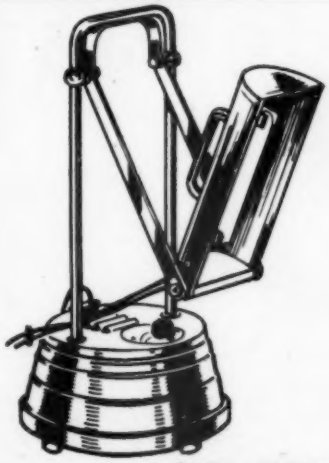
The degree to which nicotine is a factor is apparently not related to the number of cigarettes smoked daily. A man who for many years has smoked three packages daily changed to low-nicotine cigarettes without the slightest difficulty.

The study was made with 24 habitual smokers, all inhalers.

After a month of recording the number of cigarettes smoked daily when the subjects smoked their accustomed brands, each was given at least two cartons of specially prepared cigarettes to which nicotine had been added, followed by at least four cartons of low-nicotine cigarettes and then by two cartons of the ones containing added nicotine. The cigarettes were all made from tobacco naturally low in nicotine content. When the nicotine was added to these for the experiment, smoke from them assayed at almost six times as much nicotine as smoke from the cigarettes without added nicotine.

Of the 24 smokers, six "experienced no change in their physical or mental tranquility" while on the low-nicotine cigarettes. A vague initial lack in the satisfaction usually derived from smoking was felt by six. Three definitely missed the nicotine but got used to the change in one to two weeks. The other nine definitely missed the nicotine throughout the experimental period. They were more irritable, had trouble concentrating on mental tasks and felt an "inner hunger or emptiness."

Science News Letter, August 4, 1945



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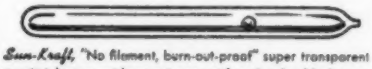
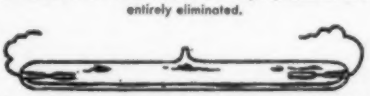


Sun-Kraft, "No filament, burn-out-proof" super transparent quartz tube can not burn out, can not fog, develop black spots or weaken in ultraviolet radiation. Costly replacements are entirely eliminated.



Conventional type electrode or filament activated tube. Deteriorates quickly because of the fused in metal. It will develop black spots fast, reducing ultraviolet radiation and eventually burning out entirely, necessitating costly replacements.

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❁ *PORTABLE ice cream machine, easily transported by truck, is used by the Army in the tropics to refresh men in combat areas. About six and a half feet long and less than half as wide, it can turn out two and a half gallon batches every 10 minutes or so, made from a dehydrated mixture to which water is added, then whipped and semi-frozen.*

Science News Letter, August 4, 1945

❁ *REPRODUCER of letters, maps and engineering and architectural drawings is a new machine that will print and dry-develop as much as 30 feet of material a minute, producing positive prints. The material is sensitized with special azo dyes; ammonia vapor is the developing agent. No washing, fixing or drying is necessary.*

Science News Letter, August 4, 1945

❁ *CLAMPS for clothesline poles keep the prop from slipping and falling when the wash on the line swings with the wind. The pole has a deep notch on its end to engage the line. A pivoted flat piece of material with a notch on its side and attached to the side of the pole holds the rope firmly when swung into place.*

Science News Letter, August 4, 1945

❁ *PLASTIC CLOGS for locker room and shower wear, have soles, heels and arches molded to the shape of the foot.*

An adjustable textile band over the instep holds the sandal in place, and molded ridges around the edge and under the center of the sole, shown in the picture, prevent slipping on wet floors.

Science News Letter, August 4, 1945

❁ *PLIERS, to grip an object and lock in gripping position, resemble an ordinary pair of pliers but have a hinged latch-arm normally inside one handle which, when released by pressure of the thumb on a spring, swings across between the two handles. Triangular teeth on the latch-arm engage a tooth on the opposite handle.*

Science News Letter, August 4, 1945

❁ *SUPPORTING device for a camera, by which it can be held in place on the side of a post or a tree, is an arm with a screw end for inserting into the wood. The other end, with a ball joint, grasps the camera, the position of which can be adjusted by use of a thumb-screw.*

Science News Letter, August 4, 1945

❁ *CEILING board prop, to hold ceiling covering in position while being attached in place, is a telescoping rod with an extended base and two hinged arms at the top which open out to support the ceiling board. By means of a handle on the side, the board is elevated into place and held by ratchets inside the prop.*

Science News Letter, August 4, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 270.*

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